



# Cornell University

Fall 2008

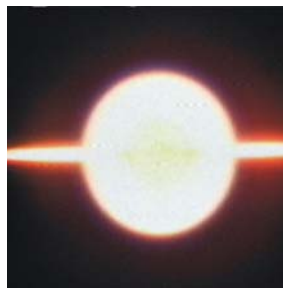


## opening for a graduate student in Mechanical and Aerospace Engineering leading to a Ph.D from Cornell

**all expenses paid: tuition scholarship + living allowance**  
**project title: New Fuels for Improved Combustion**

We have a new project funded by NASA to study fuel droplet combustion in microgravity to develop replacements for real fuel systems (jet and bio-fuels) by developing surrogate blends of mixtures of single component fuels. The motivation is driven by concerns for global energy and the environmental impacts of fuel combustion. The project is part of an effort planned for the **International Space Station** in the next few years. The droplet burning geometry of interest is spherical symmetry as promoted by removing convection:

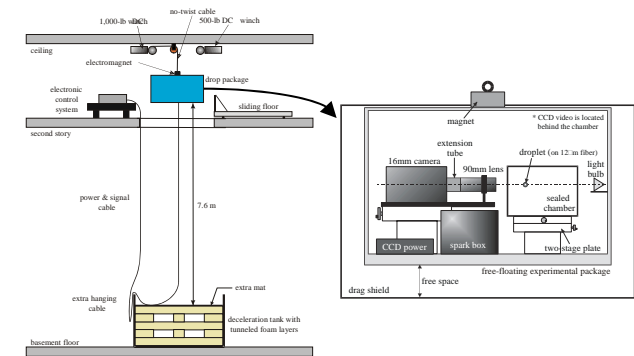
1 mm



jet fuel burning in an oxygen/nitrogen mixture (flame is very bright and spherical)



jet fuel burning in an oxygen/helium mixture (flame is blue and luminosity has disappeared)



drop tower is used to eliminate convection by reducing gravity

schematic of package

Spherical droplet flames enhance the understanding of complex processes like soot formation, and they have a direct link to combustion of sprays:



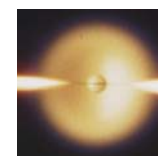
spray



cluster of droplets



single droplet with convection



single droplet without convection

for further information, please contact Prof. C. Thomas Avedisian at [cta2@cornell.edu](mailto:cta2@cornell.edu) (<http://mae.cornell.edu/index.cfm/page/fac/avedisian.htm>); for general information about Cornell, see <http://www.cornell.edu/>